the axis, thus becoming more conspicuous. In the indefinite mode of inflorescence the older flowers are placed at the lower part of the flowering axis; hence in the commonest form of inflorescence with proterandrous flowers, the lower flowers are in the second or female stage at the time when those in the upper part are in the first or male stage. In proterogynous dichogamy with indefinite inflorescence, the older flowers are in the second or male stage when the upper and younger flowers are in the female stage. In *Scrophularia nodosa* we have a plant in which proterogynous dichogamy is associated with an *inconspicuous* corolla. The stigma after fertilisation is removed out of the pathway to the nectar by the bending back of the style on the outside of the corolla, while the stamens straighten out to occupy the place formerly held by the stigma. The corolla is small and obscurely coloured, being greenish, tipped with brown. The inflorescence is lax, and the flowers scattered all round the axis. The odour of the flowers and the presence of a nectariferous gland shows that the plant is fertilised by insects, and not by the wind. Among such inconspicuously-coloured flowers, proterogynous dichogamy seems to prevail, just as proterandry is characteristic of brightly-coloured flowers. Hitherto it has not been shown how an entomophilous plant could advantageously possess a small uncoloured corolla, and be proterogynous. Watching the mode in which wasps visited the *Scrophularia nodosa* afforded the solution of the problem. The first flower visited by the wasp was the top one, and it passed irregularly downwards from flower to flower, and left the inflorescence by the lowest flower. Bees, when collecting honey, do the reverse, visiting the lowest flower first, and proceeding from flower to flower in regular succession from below upwards, leaving by the top flower. The order in which the flowers are visited is therefore of the greatest importance. In Gladiolus, for example, the bee begins at the lowest flower, and will deposit any pollen brought by it from a neighbouring spike, and as it passes upwards, it will get from the *upper flowers*, a fresh supply of pollen to apply to the lower flowers of another spike. In *Scrophularia nodosa* the wasps, which are less highly specialised as honey collectors, chiefly visit the flowers and proceed from above downwards, leaving the inflorescence with pollen from the lower flowers to apply it to the stigmas of the proterogynous upper flowers.

Wasps differ from bees in one important point, viz., that while bees are purely vegetable feeders, wasps add to a vegetable diet by preying largely on insects smaller than themselves. Throughout the animal kingdom carnivora are endowed with keener powers of vision and scent than vegetable-feeding creatures. That keenness of vision which enables a wasp to descry its prey at a distance, aided by its acute sense of smell, in all probability also enables it to discover these obscure flowers, without the guidance afforded by a coloured corolla, the materials that would be required for its production being employed more economically by the plant, just as in cleistogamic flowers. The wasp also gains an advantage, as it has a better chance of finding honey in these obscure flowers on account of their being easily overlooked by insects less highly endowed as regards powers of scent and vision.

Notes on Dimorphic Plants, by A. S. Wilson, M.A., B.Sc.—The author pointed out that *Erythræa centaurium* was probably dimorphic, as it exhibited heterostyly, and had two kinds of pollen-grains. *Silene acaulis* was shown to have three kinds of flowers, male, female, and hermaphrodite, thus resembling *S. inflata*, which Axel has shown to be triœciously polygamous.

Some Mechanical Arrangements Subserving Cross-fertilisation of Plants by Insects, by A. S. Wilson, M.A., B.Sc.—The plants considered were *Vinca minor*, *Pinguicula vulgaris*, and the foxglove, and the author described the various structural peculiarities in the different flowers.

THE FRENCH ASSOCIATION

AS might have been expected, M. Krantz has been appointed president for the Congress of 1880; but, contrary to all expectation, the decision of the Council who had proposed Algiers as the place of the meeting for 1880 has been altered, and Rheims has been chosen by a large majority. This unexpected vote will create some dissatisfaction in the colony, where great expectations had been raised by the coincidence of the anticipated arrival of the Association and the celebration of the fiftieth anniversary of the conquest.

Dr. Janssen delivered, in the large room of the Sorbonne, a lecture on the present state of physical astronomy, which was completely successful; but it was deeply regretted that no direct news had come of the eclipse and the discovery of Vulcan.

A great *soirée* was given in the Conservatoire des Arts et Métiers, and M. Cornu delivered, in the large hall, an able lecture on Polarisation. The most important part of the display was a series of twenty Jablockhoff lights, exhibited in the gardens. The effect, although splendid, cannot be said to have been better than in the Avenue de l'Opéra and round the Arc de Triomphe.

A banquet of 200 covers was given on Thursday, at the Continental Hotel, to M. Bardoux, the future president of the Montpellier meeting, and present Minister of Public Instruction. On the following evening a great reception was held at the Ministry of Public Instruction, M. Bardoux having opened his *salons*, not only to the members of the Association, but also to the delegates of public schools now visiting the Exhibition at the public expense.

The Paris meeting, however, has been comparatively lost amongst the many special congresses which are taking place without interruption in the Trocadéro, and of which none attracts much public notice. Meteorology had its special congress, holding its sitting at the very same hour when the meteorological section of the French Association was deliberating. Although a large number of influential meteorologists had congregated, none of them could find the means of attending regularly both meetings.

No paper of real importance has been read in any of the sections.

In provincial cities the coming of the Association is always coupled with the inauguration of some public monument, library, museum, schools, &c. No similar ceremony took place in Paris, so that in that respect, as in many others, this thriving Association may be said to have lost a year.

M. Frémy, in his presidential address on soda and steel, traced the history of the improvements in the manufacture of these productions during the past century, showing that at every important stage science stepped in and pointed out the direction which practice ought to take in order to secure progress and success. Science was always at her post, ready to solve, to the advantage of industry, all the problems proposed to her. In showing the important services that science has thus rendered to industry and to the country, he wished to prove that in supporting men of science, by encouraging scientific production, we give to the country natural forces and accomplish a patriotic act. Blind and egoistic spirits have dared to say that science has no need of encouragement, that the true man of science forms himself all alone, that he knows how to triumph over obstacles, that the difficulties which he meets with are necessary trials which only arrest mediocrity, and that he who stops by the way, wanting the scientific inspiration, deserves his fate. Such affirmations are only maintained by those who have not known the difficulties of the scientific career, and who often owe their advancement to favour. We could, alas! cite many examples which prove that the most ardent and courageous man of science may be arrested in his labours by invincible obstacles. M. Frémy then referred in warm terms to the many generous individuals who in France have come to the aid of scientific research, and at the same time said it would be unjust not to recognise all the efforts which have been made in recent years by the state to maintain in France the higher scientific studies. Magnificent and well-endowed laboratories, new scientific chairs, the school of higher studies—these are some of the services rendered by the French government to science. But it is necessary to attract to these laboratories men who are capable of making good use of them, men who really possess the vocation for scientific research, and to prepare a scientific generation to succeed the present. M. Frémy then showed that the French Association might help greatly in promoting this service to science.

PROF. HAECKEL ON THE DOCTRINE OF EVOLUTION

ON Thursday, August 28, a banquet was given to Prof. Haeckel, at the Grand Hotel, Paris, by a number of his admirers, on the occasion of his presence at the Paris meeting of the French Association. A congratulatory address was delivered in the name of the Reception Committee by M. Jules Soury, one of the Staff of the National Library, who said

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that men of science were witnessing a secular movement of renovation in France as well as in Germany. Prof. Haeckel then gave an address, containing one of the most uncompromising statements of what he believes to be the logical consequences of his doctrine that has been given by any living evolutionist. We translate from the *Revue Scientifique.*

"The friendly support which I have received in your midst touches me more than I shall say, for it is not only the man and the works which he has been able to produce that you have wished to honour; our profound love of scientific truth, our philosophical beliefs, our faith in the theory of evolution and in that doctrine of descent for which I venture to say I have already fought well, this, gentlemen, is the secret of the sympathy which unites us to-day. I have seen with great joy in the meetings of the scientific congress how the theory of evolution has already, whatever may be said, penetrated the spirit of French *savants*. In the sections of Biology the theory of transformism has appeared to many speakers the only explanation of the phenomena of life which they have studied. The last consequence of that doctrine—the descent of man, not only from the apes, but from all the series of lower organic forms, has even been proclaimed and vigorously defended by M. de Mortillet in the Anthropological Section."

"Prof. Haeckel then proceeded to state the doctrine of the descent of man, so well known in connection with his name. "Certainly," he said, "man does not descend directly from any existing anthropoids. No serious naturalist has professed that doctrine, which has currency only among the general public and theologians. For a long time frivolous and ignorant people have found a subject of pleasant and innocent gaiety in the thought that we wish to pass them off as improved apes. No one dreams of this; but certain professors of philosophy, and a number of facetious preachers, nourish this prejudice, which brings them fine and easy successes. They do not seem to have any idea that they furnish the best argument in favour of that theory, if it is sustainable. Are not their *naïve* pride, their infantine vanity, weaknesses of character which the apes have left us as a legacy? There can be no doubt that man and the apes of the Old and New World are descended from a common ancestor.

"That which, sooner or later, will lead all good minds to transformist doctrines is the feeling, every day more profound among us, of universal causality, of development, of continuity in nature. The number increases every day of those who seek the truth, the whole truth, and who rest only in the clear vision of the universal connection of effects and causes.

"Reason, causality, mechanism, on one side; superstition, mysticism, teleology, on the other. The theory of evolution, which considers and embraces entire nature as one whole, has replaced final causes by efficient causes. This has already been accepted, at least by philosophical minds, the only ones of which we need take count, for the old doctrines of the final causes of the unwise, the immutability of species, sterility of hybrids, geological catastrophes and successive creations, the impossibility of spontaneous generation, and of the youth of man on the earth.

"We cannot say at what moment of time nor under what conditions the first living beings appeared at the bottom of the sea, but there can be no doubt that they have been formed chemically from inorganic carbon compounds. The primitive monads were born by spontaneous generation in the sea, as saline crystals are born of their mother-waters. There does not exist, in fact, any other alternative to explain the origin of life. He who does not believe in spontaneous generation, or rather in the secular evolution of inorganic matter, into organic matter, admits miracle. It is a necessary hypothesis, which cannot be ruined either by *à priori* arguments or by laboratory experiments.

"The time has arrived to replace the antique dualistic and neological conception of life and spirit by the monistic or mechanical conception of the universe. We have arrived at the boundaries of the old and new faith. Mystery exists, perhaps impenetrable; in any case, scholastic arguments will not pierce it. The doctrine of final causes has all the *naïveté* of the explanations which prevail among savages and children; the theories of Lamarck and Darwin have given the last stroke to that decripit doctrine. Modern morphology is irreconcilable, not only, I say, with the dogma of creation, but with that of a Providence or of a vague idealistic Pantheism, of the kind associated with the names of Hegel, Schopenhauer, and Hartmann. If there certainly exists in reality, as I have striven to show, an etiological connection between individual development and the development of ancestry, between ontogenesis and phylogenesis, the phenomena of human embryology are only *mechanical* and necessary effects of the evolution of our remote ancestors, conformably to the laws of heredity and adaptation.

"Seventy years ago, permit me to remind you, the great Lamarck created the theory of descent, which Darwin, half a century after, was to develop by fecundating it with his doctrine of selection, founded on the physiological properties of heredity and adaptation. Goethe had also conceived that doctrine very philosophically. For it is the honour of our conception of things to have seduced philosophers, poets, and critics, such as Kant, Goethe, and Strauss.

"These great and noble geniuses saw imperfectly, gentlemen, that which we see better to-day; I mean to say that the theory of evolution is only a particular case of the most vast of cosmical hypotheses, that of the transformation and conservation of the physical forces. This is what the best minds, the most judicious and wisest, such as the eminent naturalist of Montpellier, of whom France ought to be proud, Prof. Charles Martins, now admit with entire good faith. According to Prof. Martins, in fact, "the theory of evolution binds together all questions of natural history, as the laws of Newton have bound together the movements of the celestial bodies. *That theory has all the characteristics of the Newtonian laws.*"

"Certainly, the laws of life, morphological laws, the laws of transformation of living beings, under the influence of adaptation and heredity, of selection and vital concurrence, are not susceptible of the mathematical rigour of the laws of astronomy. We cannot, however, doubt that they exist, as we do those of psychology, ethology or science of character, and social science. It is, I think, somewhat *naïve* to insist, as is often done, on the numerous anomalies which are observed among living human beings. These anomalies are only apparent as are perturbations in astronomy. If we possessed all the elements of these morphological laws, the solution, at least in part, of which I have at heart, we should see that these apparent anomalies are explained by the general laws of mechanics. No one denies that the extreme instability of the elements constituting the woof of organised beings renders biological problems of an infinite complexity.

"Our mission—to which we have succeeded after the great heroic generation of *savants* of the eighteenth century—for they were heroes, gentlemen, and the greatest of all perhaps, the Laplaces, Lavoisiers, Kants, Lamarcks, Frederick Wolffs—our mission to all, naturalists, physiologists, physicians, philosophers, linguists, historians, is to continue those traditions of powerful thought and manly love of liberty which made our grandfathers almost the equals of those Greeks of Ionia and Attica whom we venerated in our infancy as the fathers of all human science."

PROF. NORDENSKJÖLD ON THE COMPOSITION AND COMMON ORIGIN OF CERTAIN METEORITES[1]

PROF. NORDENSKJÖLD on comparing the composition of the meteorites which fell at Ställdalen in Sweden on June 28, 1876 (NATURE, vol. xvi. p. 238), with that of a number of other meteorites, has found that a remarkable similarity, if not identity, is disclosed by excluding the larger or smaller quantities of oxygen and sulphur which enter into their composition, and taking into consideration only the metallic constituents, irrespectively of their being oxidised or not. This similarity in composition is found to exist between various meteors, which, according to the common method of giving the results of analyses of meteorites, that is, by stating separately the metallic iron, sulphide of iron, soluble and insoluble silicates, &c., appear to be of quite dissimilar nature and composition. The meteorites compared are :—

I. Erxleben, 1812, April 15, analysed by Stromeyer.
II. Lixna, 1820, July 12, analysed by A. Kuhlberg.
III. Blansko, 1833, November 25, analysed by Berzelius.
IV. Ohaba, 1857, October 15, analysed by Bukeisen.
V. Pillistfer, 1863, August 8, analysed by Grewingk and Schmidt.
VI. Dundrum, 1865, August 12, analysed by Haughton.
VII. Hessle, 1869, January 1. *a*, analysed by G. Lindström,

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[1] Abstract of paper in *Trans.* Geol. Union of Stockholm, 1878, No. 44.

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